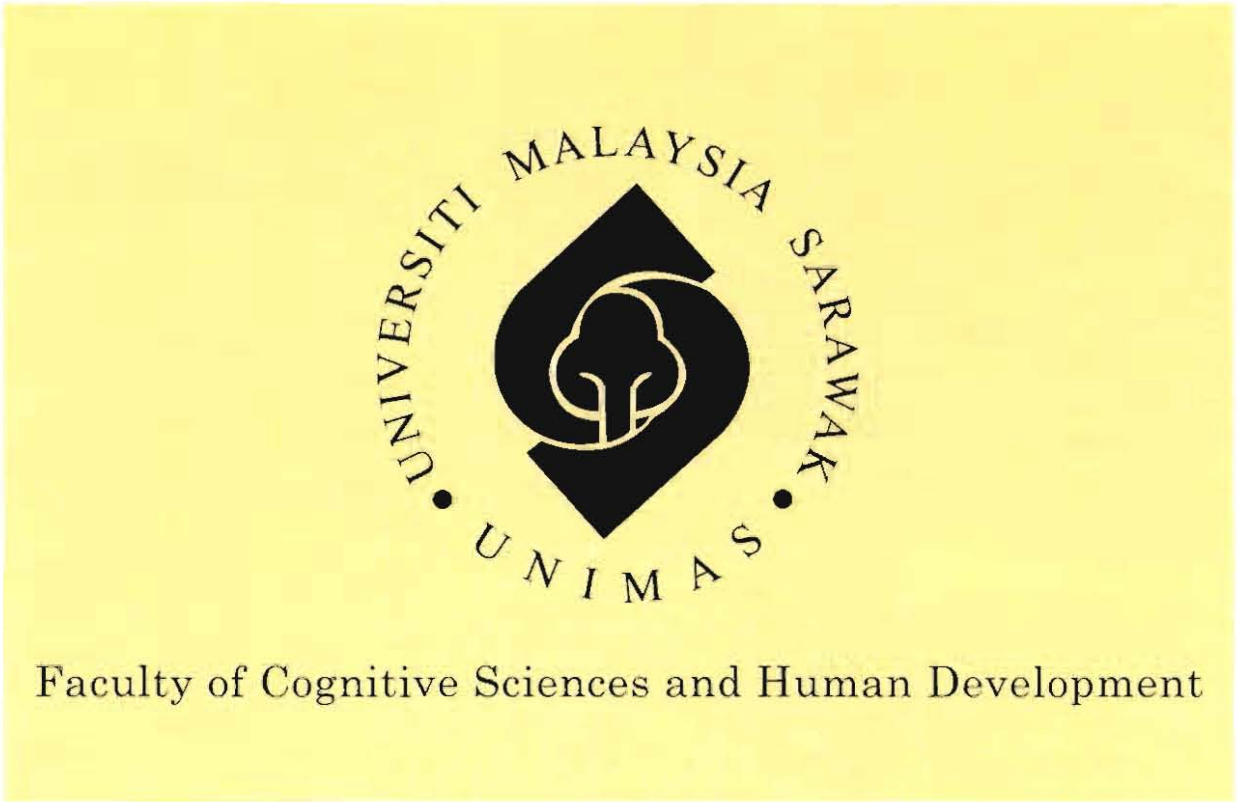

THE EFFECT OF BLUE AND YELLOW COLOURED OVERLAYS ON READING AMONG AUTISM SPECTRUM DISORDER (ASD)

Jessica Yang Hueh Yeing

Bachelor of Science with Honours
(Cognitive Science)
2017

UNIVERSITI MALAYSIA SARAWAK

Grade: A

Please tick one

Final Year Project Report ☒

Masters ☐

PhD ☐

DECLARATION OF ORIGINAL WORK

This declaration is made on the 5 day of JUNE year 2017.

Student's Declaration:

I, JESSICA YANG HUEH YEING, 47091, FACULTY OF COGNITIVE SCIENCES AND HUMAN DEVELOPMENT, hereby declare that the work entitled, THE EFFECT OF BLUE AND YELLOW COLOURED OVERLAYS ON READING AMONG AUTISM SPECTRUM DISORDER (ASD) is my original work. I have not copied from any other students' work or from any other sources with the exception where due reference or acknowledgement is made explicitly in the text, nor has any part of the work been written for me by another person.

5 JUNE 2017

JESSICA YANG HUEH YEING (47091)

Supervisor's Declaration:

I, PROFESSOR MADYA DR. NORSIAH BINTI FAUZAN , hereby certify that the work entitled, THE EFFECT OF BLUE AND YELLOW COLOURED OVERLAYS ON READING AMONG AUTISM SPECTRUM DISORDER (ASD) was prepared by the aforementioned or above mentioned student, and was submitted to the "FACULTY" as a *partial/full fulfillment for the conferment of BACHELOR OF SCIENCE WITH HONOURS (COGNITIVE SCIENCE) , and the aforementioned work, to the best of my knowledge, is the said student's work

Received for examination by: _____ Date: 5/06/2017

(PROF. MADYA DR. NORSIAH BINTI FAUZAN)

I declare this Project/Thesis is classified as (Please tick (√)):

☐ **CONFIDENTIAL** (Contains confidential information under the Official Secret Act 1972)*

☐ **RESTRICTED** (Contains restricted information as specified by the organisation where research was done)*

☒ **OPEN ACCESS**

I declare this Project/Thesis is to be submitted to the Centre for Academic Information Services (CAIS) and uploaded into UNIMAS Institutional Repository (UNIMAS IR) (Please tick (√)):

☒ **YES**

☐ **NO**

Validation of Project/Thesis

I hereby duly affirmed with free consent and willingness declared that this said Project/Thesis shall be placed officially in the Centre for Academic Information Services with the abide interest and rights as follows:

- This Project/Thesis is the sole legal property of Universiti Malaysia Sarawak (UNIMAS).
- The Centre for Academic Information Services has the lawful right to make copies of the Project/Thesis for academic and research purposes only and not for other purposes.
- The Centre for Academic Information Services has the lawful right to digitize the content to be uploaded into Local Content Database.
- The Centre for Academic Information Services has the lawful right to make copies of the Project/Thesis if required for use by other parties for academic purposes or by other Higher Learning Institutes.
- No dispute or any claim shall arise from the student himself / herself neither a third party on this Project/Thesis once it becomes the sole property of UNIMAS.
- This Project/Thesis or any material, data and information related to it shall not be distributed, published or disclosed to any party by the student himself/herself without first obtaining approval from UNIMAS.

Student's signature: _____ Supervisor's signature: _____

Date: 5 JUNE 2017 Date: 5/06/17

Current Address:

Jalan Datuk Mohammad Musa,
94300 Kota Samarahan, Sarawak, Malaysia.

Notes: * If the Project/Thesis is **CONFIDENTIAL** or **RESTRICTED**, please attach together as annexure a letter from the organisation with the date of restriction indicated, and the reasons for the confidentiality and restriction.

THE EFFECT OF BLUE AND YELLOW COLOURED OVERLAYS ON READING AMONG AUTISM SPECTRUM DISORDER (ASD)

JESSICA YANG HUEH YEING

This project is submitted
in partial fulfilment of the requirements for a
Bachelor of Science with Honours
(Cognitive Science)

Faculty of Cognitive Sciences and Human Development
UNIVERSITI MALAYSIA SARAWAK
(2017)

The project entitled 'The effect of blue and yellow coloured overlays on reading among Autism Spectrum Disorder (ASD)' was prepared by Jessica Yang Hueh Yeing and submitted to the Faculty of Cognitive Sciences and Human Development in partial fulfilment of the requirements for a Bachelor of Science with Honours (Cognitive Science).

Received for examination by:

(PROF. MADYA DR. NORSIAH BINTI FAUZAN)

Date:

5/06/17

Grade

ACKNOWLEDGMENTS

It is truly blessed that I am able to write a final year dissertation in my degree honor in Cognitive Sciences course, in University Malaysia Sarawak. First of all, I would like to thank God that always lead me and guide me whenever I faced challenges in my dissertations. Besides, I am thankful that God has delivered me a lecturer, Prof. Madya Dr. Norsiah bt Fauzan that has deep interest on my topic of my research study as my supervisor. I appreciate my supervisor for being so responsible in delivering the ideas and knowledge at every stage of my dissertations. Without her assistance and dedicated involvement in the research, this paper can never be accomplished. In addition, I would like to say thanks for all the lecturers in FSKPM who willing to share the knowledge with their students and provide us the best guidelines in finishing the dissertations.

Next, I would like to say thanks and full of appreciation to all my subjects from the four centers, Sri Eden, KL, Trinity Learning Center, KL, The Bloomer Training Center, KL, and The Inclusive Outdoor Classroom, Puchong. Thank you for the principals and the teachers same goes to the parents that willing to provide permission for me to conduct the research study with the subjects. Every subject was taking the study seriously because they were willing to contribute to the society. Next, I would like to say thanks to my friend, Mr Benny Tham for helping me in purchasing the limited stocks of coloured overlays and sent to me all the way from U.S.A.

The acknowledgment is also dedicated to my course mates and best friends, Eve Law, Ling Nie Hui, Ling Mee Yien, Lim Sing, Peggy Wong, Pearly Oh and Ho Jen Ying for helping me by supporting me in my dissertation. Nonetheless, I would like to thank my Abundant Life Church's Members and Blessed Church's members and my

Facebook's friends who supported me and provided me the information while I was searching for subjects in my study.

Most importantly, I would like to say thanks to my parents and my family members. My parent's support and nourishing care have molded me into a better person since young. They provide me unfailing love and giving me physically and mentally support throughout my dissertation. Without them, there is not who I am today.

Once again, I express my heartfelt gratitude to everyone that helped me and supported me in my study.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

This research is to examine the effectiveness of blue and yellow colour overlay on reading among the children with ASD. A quasi experiment pretest and posttest study were conducted between three groups where the children were divided into using blue coloured overlay, yellow coloured overlay and control group. T-test showed no significant difference between the two colours and the control group. However, Mean comparison showed highest mean for yellow, followed by blue and control group. The effect size was calculated using the formula of Cohen's d for yellow group and control group; blue group and control group respectively. The results are 0.53 for the yellow group and 0.57 for the blue group. Yellow overlay helped in achieving stable occlusion. Blue colour overlay has shorter wavelength showing moderate effect. The results showed promising effect of using coloured overlay as suggested by the theoretical review where the blue cone inhibit magnocellular neurones. It makes the letters to keep still instead of moving. The blue light research studies believed the blue wavelength were able to decrease the level of the melatonin secretion at night, which affected the suprachiasmatic clock and cause people to feel awake. Therefore the decreasing of melatonin level in the morning can increase the level of alertness.

Keywords: blue coloured overlays, yellow coloured overlays, Autism Spectrum Disorder (ASD), effect size.

ABSTRAK

Kajian ini dijalankan untuk mengkaji keberkesanan atas kegunnaan lapisan yang berwarna biru dan kuning dalam kalangan kanak-kanak Autism. Eksperimen kuasi dijalankan dalam kalangan kanak-kanak Autism. Tiga puluh kanak-kanak dibahagikan kepada tiga kumpulan, iaitu kumpulan kawalan, kumpulan lapisan biru dan kumpulan lapisan kuning. Keputusan T-test menunjukkan tiada perbezaan atas pengunaan kedua-dua warna lapisan dengan kumpulan kawalan. Walau bagaimanapun, warna kuning menunjukkan min yang paling tinggi diikuti oleh kumpulan kuning dan kumpulan kawalan. Saiz berkesanan (effect size) dikira menggunakan formula Cohen d' dan didapati keputusan 0.53 atas kumpulan kuning dengan kumpulan kawalan dan 0.57 atas kumpulan biru dengan kumpulan kawalan. Lapisan kuning membantu dalam pencapaian kestabilan oklusi. Warna biru mempunyai panjang gelombang yang pendek menunjukkan sederhana saiz berkesanan. Kegunaan biru lapisan dicadangkan kerana biru dapat membantu dalam penglihatan supaya tulisan tidak akan bergerak semasa proses pembacaan. Didapati bahawa warna biru dapat mengurangkan tahap rembesan melatonin pada waktu malam dan membantu orang berasa semangat pada waktu pagi. Oleh hal demikian, kekurangan tahap melatonin pada waktu pagi akan meningkatkan tahap kecerdasan.

Kate kunci: lapisan biru, lapisan kuning, Autism, saiz berkesanan.

CHAPTER ONE

INTRODUCTION

This chapter will discuss the background of the study, problem statements, objectives of the study, research questions and research hypothesis, significance of the study, and the definition of different terms in this research.

Meares (1980) and Irlen (1983), the founders of coloured overlays, suggested that transparent colouring pieces are able to enhance visibility among people who are having visual stress. Many researches have shown the effectiveness of different colour overlays on different people, such as people who facing visual stress, dyslexia, ADHD, and visual distortion (Australian Association of Irlen Consultants Inc, 2013). They are able to read a passage of words more fluently as the coloured overlays reduce the contrast between black printed words and the white background, and the theoretical mechanism in the visual cortex changed after they are using coloured overlays, which supporting the evidence of the effectiveness of coloured overlays on them (Robinson & Foreman, 1999). This study was to examine the effectiveness of blue and yellow coloured overlays on reading among children with ASD.

Background

A process of reading includes visualisation, together with cognitive processes such as semantic decoding process and attention (Lovett, 1991). Reading is a complex of information process where knowledge and semantic, syntax and text integration are connected to each other. Children with reading disability face difficulty in visualising besides encoding the words. Thus, they are unable to blend the pronunciation of the words.

Autism Spectrum Disorder (ASD) are a general group of complex disorders where an individual is facing brain disorder, having difficulty in social interacting

with other people, and having repetitive behavious problems (Autism Speak, 2016). Visual problems become a common situation among ASD, for example, they are having problem in eye contact either with people or with an object, face processing in individuals (Schultz 2005; Behrmann, Thomas, & Humphreys, 2006) and visual stress or difficulty in reading under the bright fluorescent light. These symptoms happen due to poor integration of fixing a central position vision, peripheral vision problems, and some are hypersensitive in touch and vision in the light colour (Ludlow, Wilkins, & Heaton, 2006; Research Autism, 2016; College of Optometrists, n.d.).

Coloured overlays is an invention for people who is having Meares-Irlen Syndrome (MIS), Scotopic Sensitivity Syndrome (SSS) which are also known as visual stress. Plastic coloured overlay is the transparent coloured sheets that is placed above the reading materials to improve reading by reducing headaches, eye-strain, dizziness or other physical symptoms among people who is having Meares-Irlen Syndrome. Meares (1980) and Irlen (1983) noted that the people who encounter visual stress are the people who cannot read black printed words on white paper because whenever they are reading, they feel that the words are blurred and shaking. Transparent colouring sheets are able to decrease the contrast between the black printed word and white paper by eliminating the light wavelength and motion sickness (Smith & Wilkins, 2007; Uccula, Enna, Mulatti, 2014). Brain imaging showed the calm effect from using coloured overlays with children who are having Meares-Irlen Syndrome (Daniel, 2004). In fact, the coloured overlays can reduce the symptoms of visual discomfort. Furthermore, Meares-Irlen syndrome can overlap with Autism, Asperger's Syndrome, Traumatic brain injuries, Attention Deficit Disorder, and dyslexia (Australian Association of Irlen Consultants Inc, 2013). The visualising deficit and colour perception problems that happen in autism children is widely

reported. Ludlow et al. (2006) used intuitive coloured overlays and The Wilkins Rate of Reading Test ® to study the effect of using coloured overlays among autism and the findings showed that 79% of the autism subjects were having improvement in reading rate after using coloured overlays. The findings support the benefits of coloured overlays for children with ASD in improving their eyes vision performance and influencing their rate of reading test.

According to Franklin et al. (2008), people with autism face difficulties in detecting chromatic target when chromatic background was given. The photosensitive problem such as hypersensitivity to light and colour. has been long noted as a symptom in autism spectrum disorder. Some researchers found out that they are sensitive towards fluorescent lighting as some unsuitable lighting situations are able to cause poor reading skill or difficulties in focusing while reading (Ludlow et al., 2007; Coulter, 2009; Mumford, 2013). In order to manage hypersensitivity, tinted lens are suggested. Furthermore, it has been proven that coloured overlays are able to improve reading performance (Ludlow, Wikins,& Heaton, 2006; Ludlow, Taylor,& Ludlow, Taylor-Whiffen, & Wilkins, 2012; Ludlow & Wilkins, 2016) and increase concentration period (Irlen spectral filter, n.d.).

The main visual pathways transmit information from retina to the brain are the magnocellular and parvocellular pathway. Magnocellular cells are located within the first and second layer of lateral geniculate nucleus (LGN). The magnocellular pathway detects information about movement,distance and the speed of moving object while the parvocellular cells are for understanding visual information. magnocellular problems are found among dyslexias (Stein & Walsh,1994). Stein (2001) suggested that yellow and blue coloured overlays are more effective compared to the other ten coloured of overlays. According to Stein's study, the magnocellular

deficit theory can improve among dyslexia after using coloured overlays. The study claimed that magnocellular dysfunctioning system are affecting ASD, leading them to having visual problems. However, no study has found that blue and yellow coloured overlays are effective in enhancing visual effect among ASD.

Problem Statements

Autism Spectrum Disorder (ASD) are characterized with complex brain disorder that leads to difficulty in vision and verbal communication problems (Autism speaks, 2016). It is found that 90% of the autism had sensory abnormalities in different domains (Leekam et al., 2007). In fact, biological motion perception deficit is always found in ASD (Franklin et al., 2008; Kaiser & Pelphrey, 2012). They have difficulty in making eye contact with people, and only show little facial expression with people or visual distortion perceptual cues (Ishida, Kamio & Nakamizo, 2009). Visual distortion problems can also result in inability to read the passage of words because their magnocellular fails in localising the passage of words, in which they feel the words are jumping and blurred (Myles et al., 2000; Wilkins & Evans, n.d.).

Even though there are some suggestion that coloured overlays are able to help the rate of reading performance in autism (Ludlow, Wilkins, & Heaton, 2006; Ludlow, Wilkins, & Heaton, 2007), there are still limited studies claiming that coloured overlays are able to help autism (Research autism, 2016). In Malaysia, there is still a lack of awareness towards the use of coloured overlays in visual distortions among children with ASD.

Selecting the right colour of overlays is important. Wilkins (1995) mentioned that there is no one selected colour that is able to help everyone. However, according to Ray, Fowler and Stein (2005), blue and yellow coloured overlays are the most suggested colour of coloured overlays used in reading. Stein (2005)'s study also

showed the improvement of using yellow filter as it can increase motion sensitivity, convergence and accommodation, therefore he suggested that yellow filter is able to cure magnocellular dysfunction permanently. Additionally, blue colour filter is also able to give benefits on reading performance by reducing long wavelength (Ray, Fowler & Stein, 2005). Somehow, using the yellow filter and blue filter in reading has found to benefit on reading performing, as it is in the case of dyslexia children. Ludlow et al. (2007)'s study found no significant improvement of using yellow and blue coloured overlays among children with ASD; however, the researchers claimed that the sampling size taken were small.

Research Objective

The objective of this study was to examine the effect of using blue coloured overlay on reading performance among Autism Spectrum Disorder (ASD). The second objective was to examine the effect of using yellow coloured overlay on reading performance in ASD.

Research Question and Research Hypothesis

In this study, the related research hypothesis are addressed:

H_{01} : There is no significant difference between blue coloured overlay and control group on the rate of reading performance in children with ASD.

H_{02} : There is no significant difference between yellow coloured overlay and control group on the rate of reading performance in children with ASD..

Conceptual Framework

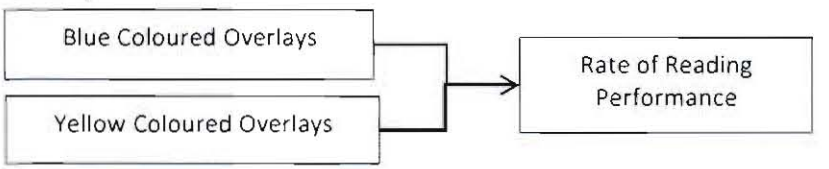

Figure 1. Conceptual Framework.

Figure 1 shows the conceptual framework used in the study. In this study, blue coloured overlays and yellow coloured overlays used are the independent variables, while the rate of reading in ASD is the dependent variable.

Significance of the Study

Autism Society (2014)'s statistical results showed that the probability of getting a child with Autism is one out of 68 children. Visual problems exist among autism. The contribution of this study will be bringing benefits to children with ASD who is still finding the effective solution to rectify reading problems. Autism research is important as it is difficult to find the best intervention that would best work for the children. The project's goal is to determine the use of blue and yellow coloured overlays in enhancing visual perceptual on reading text among children with ASD. Other researchers have proven that coloured overlays are designed to bring benefits on people who are facing reading deficit problems; yet, there are still limited coloured overlays' research among ASD. As a conclusion, it is hoped that this study will bring advantage to them.

Limitation of the Study

The limitation of the study is the difficulty in searching many children with ASD in a centre. Therefore, the experimental research was not conducted in a controlled setting only. The subjects were taken from four special needs' centres. Since the settings were different, the light source from each centre were different too. Besides, the other limitation was that not all the subjects are able to understand the symptoms questionnaires for report purposes.

Definition of terms

Autism spectrum disorders (ASD) are a group of people having neurodevelopmental disorders that share abnormalities in three major elements which

are language development, social interaction, and motor behaviour with stereotypes and restricted interests (Stafstrom, Hagerman,& Pessah, 2012). There are three levels of ASD according to DSM-V : the first is classical autism, second is high functioning autism and the third is pervasive developmental disorder (atypical autism) (Griffiths & Milne, 2007; American Psychiatric Association, 2013). High functioning autism is not having language delayed (Faras, Ateeqi, Tidmarsh, 2010) but is interchangeable with Asperger Syndrome, who is not a poor reader. IQ is used in determining the class of low and high functioning autism group, where the children with ASD who scored above 85 in their IQ test under the category of average and above average are considered to be high functioning autism (Sarris, 2015). However, they give little eye contact which can lead other people to think that they are shy or lacking interest.

There are evidence shown that abnormal retinal function occurred among ASD in early 1980s (Milne & Griffiths, 2007) where 48% of the sample were found to have abnormally low b-wave amplitude, suggesting abnormal rod function in their brain (Ritvo et al., 1988). Even though there are lacking information and sample showing the exact visuality problem happening among ASD, the results of each study showed that the incidence of visual disturbance occuring among ASD is greater than of normal people. Generally, the eye movement in visualisation in ASD is an obvious symptom happening among ASD, which concide with the dysfunctioning of cerebellar systems (vermis lobules VI and VII) and cortical system. Meanwhile, ASD group has shown deficits in magnocellular functioning, resulting in local processing bias (Milne, Swettenham, Campbell & Coleman, 2004), central disturbance and complex movement perception (Mottron, Dawson, Soulieres, Hubert & Burack, 2006).

Coloured overlay is a piece of colour transparent paper that is placed over a page to colour the background of the text without interfering with its clarity. It is invented to help Irlen-Meares Syndrome in visualising, as to reduce perceptual distortions of text (Irlen, 1983). Many children who are unable to read fluently and feel discomfort while reading are suggested to use coloured overlays for reading. There are ten colours of coloured overlays and the children are required to find one most suitable coloured overlay. Many who are having visual stress, pattern glare, or dyslexia are using coloured overlays to reduce their visual discomfort too. There are assessments designed to determine the effectiveness of using coloured overlays such as Irlen perceptual scale®, Intuitive coloured overlays® and Wilkins Rate of Reading Test. It is proven that some of the users have increased their reading speed and concentration level (Ludlow, et al., 2007).

Magnocellular theory system is from an analysis of the visual system. Lateral geniculate nucleus (LGN) is the first visual processing area after retina received the information. The sustained system located in the upper division of LGN layer which contains 80% of cells responsible in detecting spatial details, also visual perception (Nandakumar & Leat, 2008). Meanwhile, the lower layer of LGN contains 10% of cells responsible for locating the object in the field vision and giving respond in movement. While the third layer of LGN is the koniocellular layer, working on colour vision (Nandakmur & Leat, 2008). These layers are all working together, where the transient will answer the basic question "what is it?"; sustained system then providing stability, such as prevent blurring. If the magnocellular is deficit, the reader will have difficulty in reading as reading task involves eye fixation.

Visual distortion is defined as the type of impairment which happens in people's eyes. To create a good vision, the retina works together with the nervous system and

eye muscles. It is also responsible in transforming light into electrical impulses to the brain in the optic nerve. The examples of visual distortion includes blindness, double vision, eye sensitive to light, poor vision at night moment and blur vision which causes the people cannot visualise comfortably (William, 2016).

CHAPTER TWO

LITERATURE REVIEW

This chapter includes the history of coloured overlays and the benefits of using coloured overlays for different categories of users. Furthermore, the magnocellular deficit theory and cortical hyperexcitability theory will be discussed in relation to the problem of visualisation faced by children with ASD.

History of coloured overlay

Critchley (1964)'s study reported the case of dyslexia being unable to read on a black printed on white paper but are able to read the words printed on colour paper due to the high contrast effect from the foreground and background colours. In 1980, Olive Meares also described the occurrence of visual distortion in her pupils, who were able to reduce the problem by reading colour paper or using a colour transparent sheets while reading on a piece of passage on white background. Helen Irlen then further researched this area and invented coloured overlays to treat a syndrome called Meares-Irlen Syndrome (MIS), or Scotopic Sensitive Syndrome (SSS), or visual stress. These symptoms are based on the theory of hypersensitive photoreceptors, visual pathway or an inappropriate in brain system towards some wavelength of light in ones' individual. 'Visual stress' has become the most appropriate term among other terms (Wilkins, 2003; Singleton & Henderson, 2007).

Meares (1980) and Irlen (1983) noted that visual stress falls into two : the first is discomfort feeling by the readers such as a headache or photophobia while the second is perceptual distortions or visual illusions. For example, the feeling of difficulty in seeing the illusion of shape, or the double vision effect while reading. Irlen (1983) has explained the initial sign of MIS syndrome that happens when reading, either on a computer screen or on a piece of paper with many words. The MIS diagnosed

individuals will easily feel fatigue, eye strain, and tired while reading. They are unable to read fluently as they feel blurry towards the screen.

The second problem of MIS diagnosed was found while they are doing mathematics (Irlen, 2010). People who suffer from MIS or SSS face difficulty in arranging the numbers in column or row or face trouble in shaping the geometry. Careless errors or misreading the algorithm symbols always happen among them. While they are reading, they often complain about the coordination of the words. As a consequent, they are reluctant to read as they have trouble in focusing and tracking the words. Besides, they skip lines easily while they are reading a passage. They take longer hours to read as they get distracted easily. In their writing performance, MIS diagnosed face difficulty in copying words on the board or books because they feel difficult in reading the line of words as all the words seems to have unequal spacing or unequal size to them (Irlen, 2010).

In Whiting, Robinson, and Parrot (1994)'s study, they specified visual stress to be divided into five difficulty areas. Firstly is the photophobia condition, where the reader feels uncomfortable due to the brightness of light, screen or a piece of white paper. The second difficulty found is the visual resolution condition, where fading effects occur while reading or staring on a particular place. The third difficulty is the difficulty in visual resolution while sustaining the printing words for a period is the fourth difficulty for the people who have visual stress. The fifth difficulty is depth perception, where someone finds difficulty in catching a ball, or estimating a distance while parking a car.

Irlen discovered that coloured overlays are able to enhance reading ability on this syndrome (Irlen, 2005). There are three assessments commonly found in Meares-Irlen Syndrome research, which are used to test the effectiveness of coloured overlays on

MIS diagnosed: Wilkins Rate of Reading Test (WRRT) (Wilkins, Jeanes, Piumfrey, & Laskier, 1996), Irlen Reading Perceptual Scale, Intuitive Coloured Overlays and Assessment of visual stress. Intuitive Coloured Overlay is a set of nine plus one grey coloured overlays test. The combination of colour can create up to 27 sample of chromaticities. Pairing the colours enables the colour to be more saturated. If one piece of coloured overlay did not provide effectiveness impact, a combination of two overlays can be done and more saturated colours are suggested (Smith & Wilkins, 2007). In the process of choosing the correct overlay, ten colours of coloured overlays are placed on the passage respectively and a standard question about symptoms of visual stress is asked. The readers will then be asked to choose the best coloured overlay which helped him in his reading performance. The intuitive coloured overlays are also known as the "gold standard" instrument (Kriss & Evans 2005).

Approximately 50% of the children who have ASD are having visual stress, MIS or SSS syndrome refuse to fix their eyes on targets, or poor eye contact and unable to face bright light (College of Optometrists, n.d.), the syndrome can be reduced by using coloured overlays.Wilkins Rate of the Reading Test (WRRT) is designed to test the rate of reading performance. The passage written does not bring any meaning because it is used to test the rate of reading instead of measuring comprehension (Kriss & Evans, 2005). The words in the passage are printed in small text and the spacing between the words are smaller compared to normal text (Boudoulkian et al., 2002; Wilkins 2002). This tool is able to be used in measuring the effectiveness of coloured overlays on reading performance in one minute due to the typical visually stressful conditions (Wilkins, 2002).